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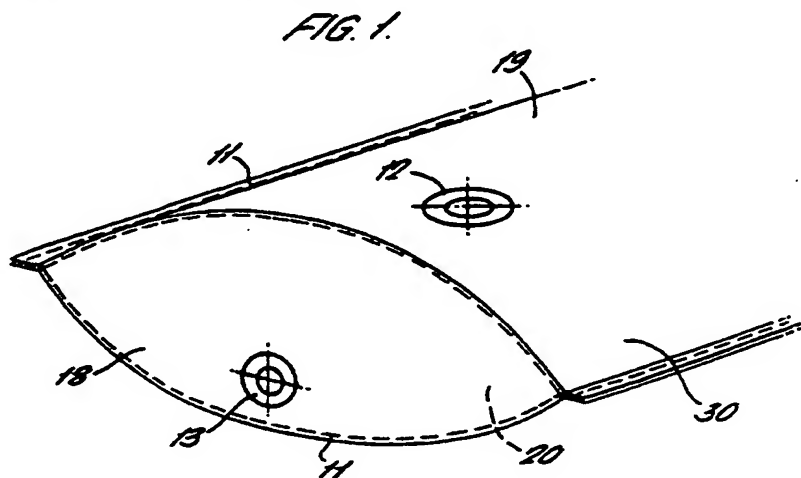
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(56) Documents Cited
GB 2160498 A **GB 2113180 A** **US 4807299 A**
US 4781475 A **US 4573508 A**

(58) Field of Search
UK CL (Edition Q) B8K KAB KWC
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(54) Abstract Title
Fluid transport container

(57) A non-rigid bulk fluid or particulate matter transport container has an inner liner 10 eg. of polyethylene, an inlet/outlet valve 12 joined to the inner liner 10 and an outer liner 30, eg. of woven polypropylene with a hole for valve 12, which encloses at least a portion of the inner liner 10 and is fixed to the inner liner 10 around the peripheral edges of the container along seams 11. The outer liner 30 provides the container structural reinforcement against the fluid forces generated within the inner liner. The container may be provided with a pressure release valve 13. The inner liner may be of a single or multi-ply construction, the outer layer is single ply. The seams 11 may be stitched and/or welded. The outer liner 30 may be attached in the back of a transporter eg. a lorry for transportation.



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FIG. 1.

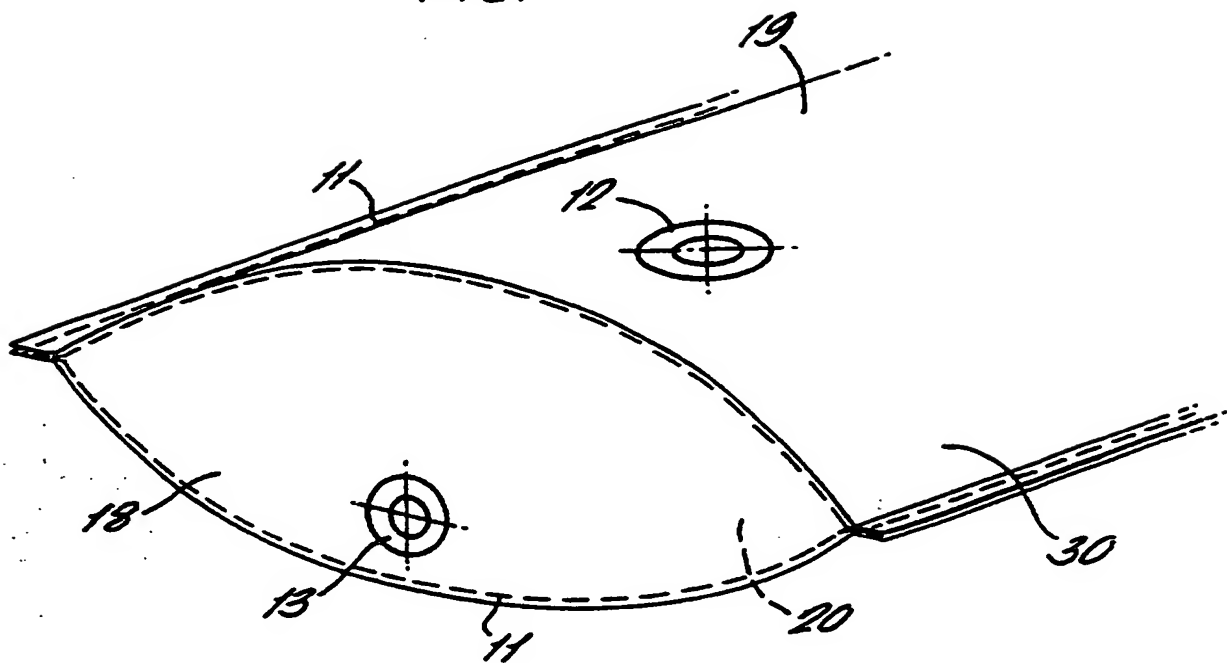


FIG. 2.

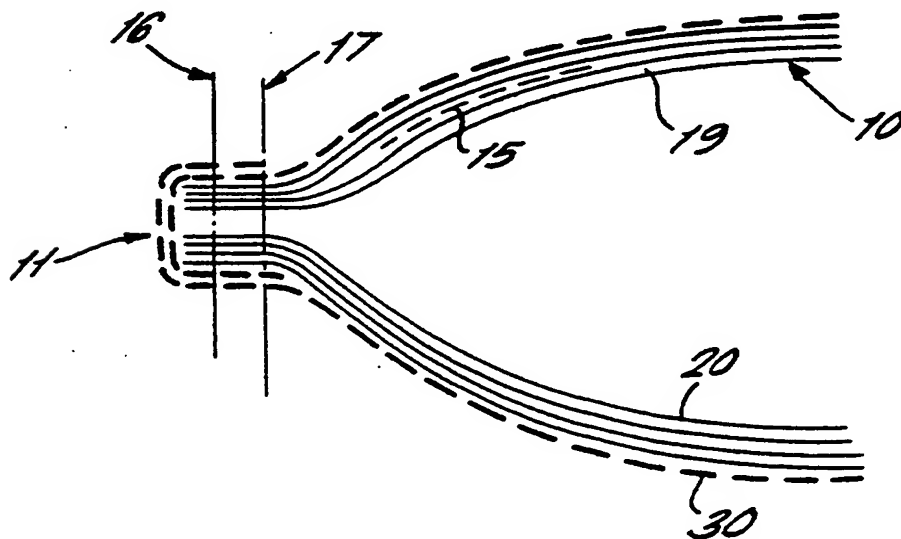
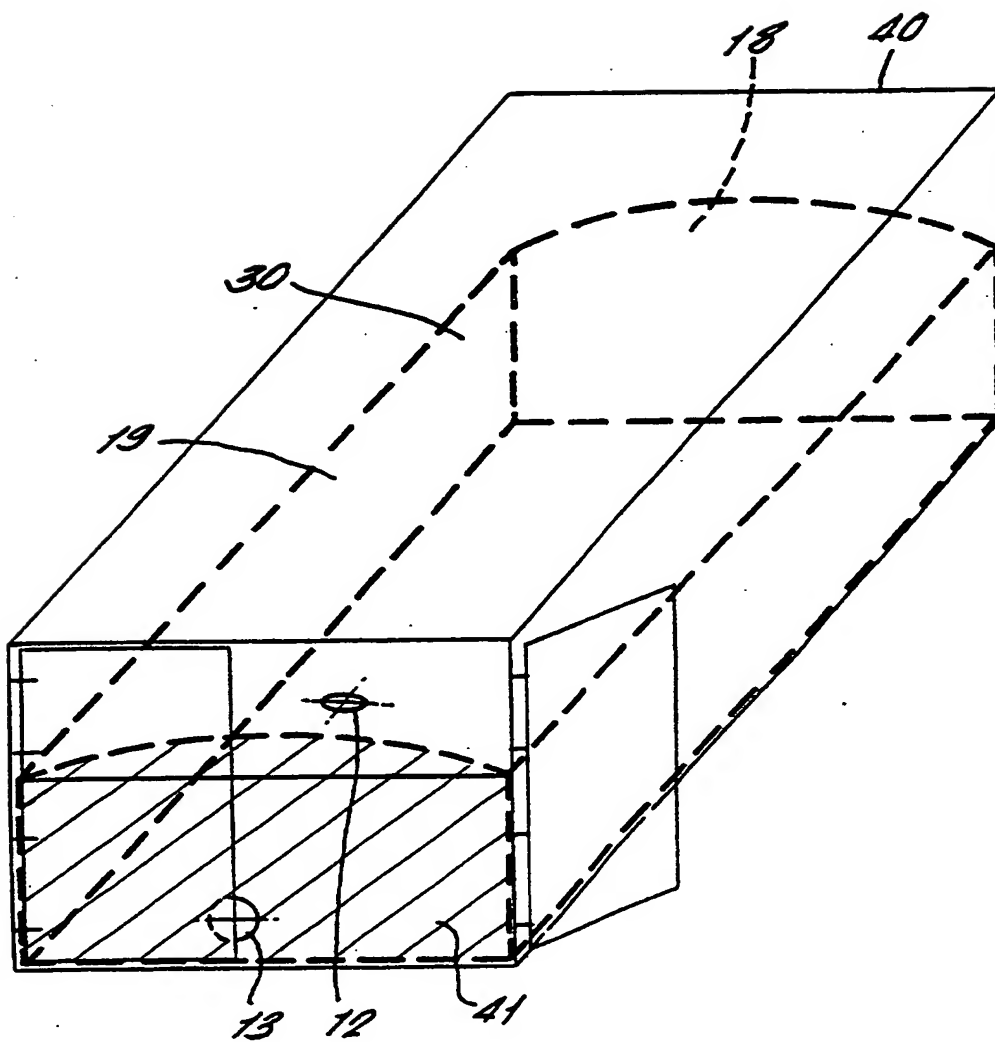


FIG. 3.



APPARATUS FOR USE IN THE TRANSPORTATION OF FLUIDS
OR PARTICULATE MATTER

5 This invention relates to an apparatus for use in the transportation of gases, liquids or particulate matter in transporters such as mobile containers, tankers, trailers, rigid van bodies or the like. The apparatus may equally be used as a free standing container for the transportation of liquid or
10 particulate matter. In particular, but not exclusively, the apparatus may be used for the transportation of gases, liquids or particulate matter in ISO containers.

15 It is known to transport liquids and particulate matter in tankers. Loads often require to be transported in only one direction. At other times, different liquids or particulate matter may be required to be transported in successive journeys. As a result, the tanker is either not utilised
20 efficiently or must be cleaned out after each journey in order to avoid contamination of the load, with a consequent decrease in the efficiency of utilisation of the tanker.

25 According to the present invention, there is provided apparatus for transporting fluids or particulate matter comprising an inner liner being provided with an orifice for loading and unloading the fluid or particulate matter, and an outer liner enclosing at least a portion of the inner liner and
30 being attached to the inner liner around at least a portion of a perimeter of the inner liner.

35 Preferably the orifice of the inner liner comprises a valve and the outer liner completely encloses the inner liner, the outer liner being provided with an aperture through which the valve protrudes.

Preferably the outer liner and inner liner are substantially tubular and the outer liner is attached to the inner liner around at least a portion of a perimeter of the inner liner.

5 Preferably the outer liner is a single ply construction.

In one embodiment the inner liner is a single ply construction.

10 In another embodiment the inner liner is a multi-ply construction.

Preferably the material of the outer liner has a greater tensile strength than the material of the inner liner to impart increased hoop and longitudinal strength to the inner liner when attached thereto.

15 Optionally the inner liner is provided with moisture and/or oxygen barrier layer.

In one embodiment the outer liner is attached to the inner layer by means of a weld.

20 In another embodiment the outer liner is attached to the inner liner by means of stitching.

Preferably the outer liner is attached to the inner liner by means of both a weld and stitching.

Preferably the outer liner is woven polypropylene and the inner liner is polyethylene.

25 Preferably side walls of the inner and or outer liner are formed as an extrusion.

The present invention also provides a transporter having apparatus as previously described installed therein.

30 Preferably the outer liner of the apparatus is attached to the transporter.

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

35

Figure 1 is a perspective schematic view of one embodiment of apparatus according to the present

invention;

Figure 2 is a cross-sectional schematic view of part of the apparatus of Figure 1; and

Figure 3 is a perspective schematic view of the apparatus of Figure 1 installed in a transporter.

The apparatus of the present invention as shown in Figures 1 and 2, comprises an inner liner 10 for containing the liquid or particulate matter to be transported, and an outer liner 30.

The inner liner may be of any desired shape and is shown in Figure 1, by way of example only, as being generally tube-like. The inner liner 10 is formed from upper and lower panels 19, 20 and end walls 18. The inner liner 10 has a prismatic shape with the end walls 18 being of a generally ecliptic shape. The outermost edges of panels 19, 20 and end walls 18 are joined to one another by means of a seam 11 to produce a sealed container space inside the inner liner 10.

The seam 11 runs around the perimeter of the inner liner 10, i.e. along the length of the two longitudinal join between the two panels 19, 20 and along the length of the joins between the end walls 18 and panels 19, 20. Preferably when the inner liner 10 is constructed the two longitudinal joins joining the two panels 19, 20 to one another lie on diametrically opposed sides of the inner liner 10.

The inner liner 10 is made of polyethylene or a similar material which is flexible and impermeable to the liquid or particulate to be transported. The inner liner 10 may have a single-ply constructions or, alternatively, a multi-ply construction. The embodiment of the inner liner 10 shown in Figure 2 is provided with an inner liner 10 having a four-ply construction. Optionally, the inner liner 10 may be provided with an oxygen and/or moisture barrier 15 as one of the plies in the construction.

The maximum volume of the inner liner 10 may be varied depending on the maximum volume of liquid or particulate matter that is likely to be required to be transported. The maximum volume of the inner liner 10 typically ranges from 1000 litres to 30,000 litres.

An inlet/outlet valve 12 is provided in the inner liner 10 to allow for filling and emptying of the liquid or particulate matter into or out of the inner liner 10. The inlet/outlet valve 12 may be situated anywhere on inner liner 10 and is shown in Figure 1, by way of example only, on a topmost surface.

The inner liner 10 may be provided with a pressure release valve 13 coupled to a manual drain tap by means of piping. The pressure release valve 13 acts to prevent a dangerous pressure build-up within the inner liner 10, depending on the nature of the liquid transported. Again, the pressure release valve 13 may be situated anywhere on inner liner 10 and is shown in Figure 1, by way of example, on an end wall 18 of the inner liner 10.

The outer liner 30 is of a generally conformal shape to that of the inner liner 10 and surrounds at least a portion of the inner liner 10. Preferably, the outer liner 30 surrounds substantially the entire inner liner 10 as shown in Figure 1. Apertures are provided in the outer liner 30 through which the inlet/outlet valve 12 and the pressure release valve 13 protrude.

The outer liner 30 is made from a material such as polypropylene and is preferably woven to improve its tensile strength and tear resistance.

The outer liner 30 is attached to the inner liner 10 around at least a portion of the perimeter seam 11 of the inner liner 10. Preferably, the outer liner 30 is attached to the inner liner 10 around substantially the entire perimeter seam 11 of the inner liner 10.

The attachment of the outer liner 30 to the inner

liner 10 may be by means of stitching, heated weld or a combination of both. The embodiment shown in Figure 2 has an attachment comprising stitching 16 and a heated weld 17 formed by, for example, ultrasonic welding. The use of both types of attachment in combination results in an improved join with increased strength and reliability. Preferably the same seaming operation step is used to join the panels 19, 20 and end walls 18 and to attach the outer liner 30 to the inner liner 10.

In use the inner liner 10 is filled with gas, liquid or particulate matter. As the volume of contents contained in the inner liner 10 increases the pressure within the inner liner also increases. The construction of the apparatus of the present invention is advantageous in that the woven polypropylene of outer liner 30 is able to withstand high levels of hoop stress and longitudinal stress in the apparatus caused by the liquid or particulate matter being contained in inner liner 10. As a result the inner liner 10, which is generally made of a material of relatively low tensile strength, is prevented from tearing or being punctured by the reinforcing effect of the outer liner 30.

The apparatus may be used as a free-standing container for transporting liquid or particulate matter. Alternatively, the apparatus may be used in conjunction with a transporter 40 as shown in Figure 3. The transporter 40 may be any suitable container such as a tanker, trailer, rigid van body or ISO container. The apparatus may simply be located in such a transporter 40 but preferably is restrained in the transporter 40 by means of ties, ropes, elasticated cords or similar. Preferably, the restraining means are provided between each end wall 18 of the apparatus and the respective end walls 41 of the transporter 40.

CLAIMS:-

1. Apparatus for transporting fluids or particulate matter comprising an inner liner being provided with
5 an orifice for loading and unloading the fluid or particulate matter, and an outer liner enclosing at least a portion of the inner liner and being attached to the inner liner around at least a portion of a perimeter of the inner liner.
10
2. Apparatus as claimed in claim 1, wherein the orifice of the inner liner comprises a valve and the outer liner completely encloses the inner liner, the outer liner being provided with an aperture through
15 which the valve protrudes.
3. Apparatus as claimed in claim 1 or claim 2, wherein the outer liner and inner liner are substantially tubular and the outer liner is attached
20 to the inner liner around at least a portion of a perimeter of the inner liner.
4. Apparatus as claimed in any preceding claim, wherein the outer liner is a single ply construction.
25
5. Apparatus as claimed in any of claims 1 to 4, wherein the inner liner is a single ply construction.
6. Apparatus as claimed in any of claims 1 to 4,
30 wherein the inner liner is a multi-ply construction.
7. Apparatus as claimed in any preceding claim wherein the material of the outer liner has a greater tensile strength than the material of the inner liner
35 to impart increased hoop and longitudinal strength to the inner liner when attached thereto.

8. Apparatus as claimed in claim 6 or claim 7,
wherein the inner liner is provided with moisture
and/or oxygen barrier layer.
- 5 9. Apparatus as claimed in any preceding claim,
wherein the outer liner is attached to the inner layer
by means of a weld.
- 10 10. Apparatus as claimed in any of claims 1 to 8,
wherein the outer liner is attached to the inner liner
by means of stitching.
- 15 11. Apparatus as claimed in any of claims 1 to 10,
wherein the outer liner is attached to the inner liner
by means of both a weld and stitching.
12. Apparatus as claimed in any preceding claim,
wherein the outer liner is woven polypropylene.
- 20 13. Apparatus as claimed in any preceding claim,
wherein the inner liner is polyethylene.
- 25 14. Apparatus as claimed in any preceding claim
wherein side walls of the inner and or outer liner are
formed as an extrusion.
15. A transporter having apparatus as claimed in any
preceding claim installed therein.
- 30 16. A transporter as claimed in claim 15, wherein the
outer liner of the apparatus is attached to the
transporter.
- 35 17. Apparatus substantially as hereinbefore described
with reference to and as shown in the accompanying
drawings.



Application No: GB 9923171.4
Claims searched: all

Examiner: Michael Young
Date of search: 7 December 1999

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): B8K (KWC) B8K (KAB)

Int Cl (Ed.6): B65D: 30/08, 30/26, 88/16

Other: ONLINE: WPI EPODOC JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2160498 A (NATTRASS) especially. fig.s 8 & 9	1,3,4,5,7,10,12,13
X	GB 2113180A (OWENS-ILLINOIS) whole document	1,3,4,5,9
X	US 4807299 (NATTRASS) whole document	1,3,4,5,10,12
X	US 4781475 (LAFLEUR) whole document	1,3,4,5,10,12
X	US 4573508 (KNAUS) whole document	1-5

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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